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THIS IS UNEVALUATED INFORMATION

SOURCE Hai-nan Tao Tzu-yuan Chih K'ai-fa. (Information requested.)

SURVEY OF HAI-NAN INDUSTRY

Minerals

The island is composed mainly of igneous rocks. Sedimentary Pleistocene formations are found along the river courses; bits of Tertiary strata may be found among the weathered granite. Geologically, the quest for minerals will be more promising in the southwest than in the northeast, and most productive where igneous and sedimentary formations overlap. Because of unsettled political conditions, prospecting has been done mostly along the coast, with very little in the interior.

1. Copper

a. Shih-lu Copper Beds.

These beds are west of the iron-ore deposits at this locality. The ore is malachite, containing 4 percent copper. The beds are estimated at 28,000 tons.

b. Southern Mine No 1

Beds are malachite, estimated at 70,000 tons, with 5.2 percent copper content.

c. Southern Mine No 2

Beds are malachite, estimated at 23,400 tons, with .6 percent [sic] copper.

Copper reserves in Hai-nan thus total 121,400 tons, with working and transportation not difficult.

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2. Iron

a. Shih-lu Mine

This mine is located in the western part of the island, is 54 kilometers northeast of Pa-so on Pei-li (Bakli) Harbor. This mine was developed and worked by the Japanese during the war. It contains a known 45 million and an estimated 200 million tons of iron ore. The iron content is 63 percent. The northern beds have 1,900,000 tons with a 60-percent iron content.

(1) Equipment

In March 1944, the Shih-lu Mine had equipment for mining 1½ million tons of rock per year. A 32-kilometer, single-track, 3-foot 6-inch gauge railroad extends from the mine to Pa-so. Originally, it had 12 locomotives and 247 cars. Pa-so port, 9 meters deep, can accommodate two 10-ton vessels. It has two cranes that can handle 1,000 tons of ore per hour, and a cable-equipped storage space for 240,000 tons.

There are now 225,502 tons stored at Pa-so. The Shih-lu reserves are ample, and the quality high, but the equipment for large-scale exploitation is not complete and has been allowed to deteriorate.

Production at the Shih-lu Mine

Year	Tons Mined	Tons Exported
1941	5,000	--
1942	95,724	51,456
1943	393,553	248,012
1944	200,997	110,900
Total	695,247	410,368

b. The Pao-hsiu and Chen-mei mines are about 2 kilometers east of the Shih-lu Mine. Hematite reserves are as follows:

Place	Est. Reserves (tons)	Fe Content (%)
Pao-hsiu No 1	3,840,000	57.54-59.68
" " 2	2,100,000	50.57-66.66
" " 3	240,000	66.84
Chen-mei	11,520,000	38.42-56.87
Total	17,700,000	

c. T'ieh-tu Mine

This mine is near the southern tip of the island, about 12 kilometers east of Yu-lin Harbor. The ore is mainly magnetite, with some hematite. Reserves are estimated at about 3 million tons, with a 63 percent iron content.

(1) Equipment

As of February 1943, there was equipment for excavating a million tons a year. A 12-kilometer, 3-foot 6-inch gauge railroad connecting the mine with An-yu originally had seven locomotives and 149 cars. A 12-kilometer, 2-foot-gauge railroad connecting the mine with Ch'uan-k'ou

STAT

originally had 19 locomotives and 850 cars. These two lines run on opposite sides of Yu-lin Inner Harbor. There is also a wharf, 9 meters deep, that can accommodate one 10,000-ton ship, two cranes capable of handling 700 tons per hour, and large storage space.

(2) Production

Year	Tons Mined	Tons Exported
1940	169,599	167,991
1941	355,921	306,634
1942	893,824	805,098
1943	918,511	832,214
1944	353,436	304,120
Total	2,691,291	2,416,057

There are 120,407 tons stored at Ch'uan-k'ou and 152,967 at An-yu.

d. Other Mines

Deposits are reported from at least 13 other places in Hai-nan, in varying amounts and with iron content ranging from 30 to 65 percent.

3. Manganese

a. About 2 kilometers east of the Shih-lu Mine are two outcrops containing manganese and other minerals as follows:

Outcrop	Mn	SiO_2	Fe	P
No 1	13.09	21.34	24.53	0.030
No 2	9.72	37.51	17.51	0.022

Reserves are estimated at 830,000 tons.

b. Shui-t'ou-yuan or Chung-huo-t'ien is situated 13 kilometers northeast of Yu-lin, and about 6 kilometers from the Y'ien-tu Mine. Here manganese oxide occurs as nodules in siliceous clay. The reserves are 21,000 tons, with a manganese content of percent.

4. Tin

Tin is found in many places in the vicinity of Na-ta (Nodoa). The cassiterite beds vary from one-third to one and a half meters in thickness, with a workable area of 4 million square meters, and an average tin content of 192.4 grams per cubic meter. This works out to a deposit content of 986 tons, of which 90 percent, 887 tons, is recoverable.

Stream tin is now largely exhausted, so further supplies must come from new discoveries near the present mines, for which the outlook is not good.

5. Quartz

The Japanese opened a modest working at Yang-chio-ling, about 5 kilometers south of Tun-ch'ang in Ting-an Hsien. This is an open quarry, which, at the time of its greatest activity, employed 1,000 laborers. It is now closed. Past production is as follows:

STAT

Year	Tons Quarried
1942	4,520
1943	23,537
1944	88,388
Total	116,445

Stock on Hand (tons)

Hai-k'ou	1,800
Chia-chi	22,290
Yu-lin	9,000
Total	33,090

6. Limestone

a. Yen-wo-ling and O-yen-t'ung Quarries

These quarries are located east of Tung-fang in Lo-tung Hsien. The stone is plentiful and of high quality, but transportation is very difficult.

b. Pao-p'i-ling Quarries in Ai Hsien

These are about 9 kilometers north of San-ya (Sama). Reserves are estimated at nearly 5 million tons; quality is suitable for cement making.

7. Coal

(1) Chu-ch'ao-yuan

This lignite source is 17 kilometers southeast of Ting-an. The brown coal occurs as a 7- foot seam in the midst of gravel beds. It is of poor quality.

(2) Ling-ling in Ling-shui Hsien

Peat is found here, about 7 kilometers south of Ling-shui city on a sand-clay plain; however, neither quality nor quantity warrant exploitation.

8. Graphite

Graphite is found at Niu-ya-ling about 7 kilometers north of Yen-t'ang in Ch'iung-tung Hsien. The mineral is found in both sedimentary rocks and in granite, the latter form being the better. Many veins are found in this vicinity, with quality varying from 30 to 50 percent pure, and in considerable quantity.

Salt

There are many places along the coast where salt is extracted from sea water for local needs. Three large fields, San-ya, Pei-li, and Hou-shui, produce some 50,000 tons per year, of which 20,000 are consumed in Hainan and the remaining 30,000 shipped to the mainland.

Waterpower

Calculations based on rainfall and water flow of principal streams lead to an estimate of 234,000 kilowatts as the maximum hydroelectric power obtainable on the island. Of this, a maximum capacity of 38.000 kw was generated in a plant built by the Japanese in 1943, on a branch of the Ch'ang Chiang, near Tung-fang, about 10 miles south of the Shih-lu mine. [Dam at approximately 19N, 109E]

STAT

Railroads

During the occupation, the Japanese built a 178.90-kilometers-long narrow-gauge railroad from Yu-lin to Pei-li and a 55-kilometers-long line from Pei-li to the Shih-lu Mine. There were also short lines in the San-ya-Yu-lin area. The total kilometrage of all the lines was 266.85. Besides, there were some 10 kilometers of construction lines at various points.

Highways

A coastal highway has been built encircling the island, with a net of connecting roads to the larger towns. This net is small-meshed in the northern plains, becoming nonexistent in the central highlands save for a few forest trails. Most of the roads are unimproved, becoming almost impassable in bad weather.

Besides the three permanent bridges -- Sunrise bridge near Hai-k'ou and two others near San-ya -- the others are wooden. Since there is no flood control, they are very undependable.

Light Industry

1. Cotton

The Japanese experimented with raising cotton in several parts of Hai-nan, as shown in the following table:

Variety	Production (in catties per hectare)
Texas	600
Express	600
Trice	550
Delfos	500
Sakel	270
"	300
Pima	500
Stoneville	1,224
"	1,380
Express	450
Taiwan No 5	300

2. Paper

The Hainanese make only one kind of paper, a coarse yellow type such as is used in idol worship. The Japanese set up a paper mill in Ch'iung-chou in 1943. Monthly production of this mill in 1945 was as follows: about 400 rolls of newsprint, 3,000 rolls of cigarette papers, 200 bundles of ordinary paper, 10,000 sheets of Japanese paper, and 150 rolls of glazed paper.

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